Ground Water Control Systems

Denver CLT midrise: Dry, decontaminated site foundation

The highly anticipated Platte 15 multi-use midrise structure, located at 15th and Platte streets in Denver, has reached its final depth of 28 feet below ground. The installation of the temporary dewatering system is complete and is in the maintenance phase. General contractor Adolfson & Peterson Construction continues excavation in preparation for pouring of concrete slabs.

Two Firsts for Platte 15

Besides being Denver's first midrise building made from cross-laminated timber and offering a reduced carbon footprint, Platte 15 is the site of a rarely utilized means of groundwater control, known as ejector well dewatering. Though more costly up front, in the long run, this unusual use of ejector dewatering wells in controlling the ground water within soils typical to downtown Denver, has proven more reliable and more cost efficient.

The added benefit of this unique use of the ejector well dewatering system was the lowering of groundwater to the maximum extent possible, allowing for the excavation and installation of the foundation mat slabs and waterproofing membrane in "near-dry" conditions.

David Giles
President, TerraFirma Earth Technologies Inc.

"The proper installation of the foundation slabs and waterproofing membrane under 'near-dry' conditions is extremely important to the structure," said Shiloh Hicks, project engineer.

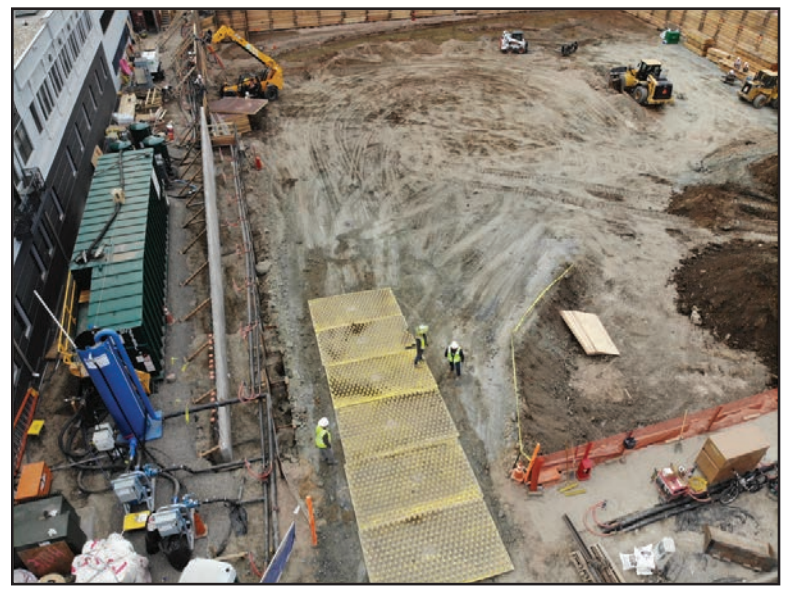
There are generally three means employed by the dewatering contractor in controlling groundwater: vacuum well points, deep wells and ejector wells. The most commonly known in the Denver area are deep wells (sometimes referred to as sump wells).

Most contractors shy away from the ejector wells due to upfront costs; however, they are more often the best solution for Denver soil conditions (water-bearing alluvial soils over shallow bedrock). Adolfson & Peterson Construction made the best decision for dewatering this project. Though ejector wells typically are utilized in much deeper excavations, they are well suited here because of the necessity to lower the groundwater to the very top of the confining bedrock.

According to Shawn Brannon, AP project manager, Platte 15 is using the CM/GC delivery method, which gave AP the opportunity to employ the "choosing by advantage" process when hiring contractors.

"This ensures a collaborative project team offering the best solutions for the particular project's requirements, rather than choosing contractors simply by cost," said Brannon. "TerraFirma was consulted well in advance of groundbreaking. Getting the project on firm ground is critical to the success of a project. We needed TerraFirma's expertise early in the preconstruction phase. They were able to give us a detailed solution to the site conditions that we could detail out before we broke ground." He added that the owner, Crescent Real Estate, applauded the "choosing by advantage" process and that it made the entire team engage wholeheartedly in the preconstruction problem-solving effort, which was a year in the making.

The Platte 15 property is being built to the property lines. Dewatering of the site was further complicated by the fact that one entire side of the site was inaccessible. The excavation has a perimeter footprint of approximately 800 linear feet (approximately 200 x 200 feet). Two levels of underground parking are planned; the excavation extends up to 28-foot bgs. TerraFirma installed 64 ejector wells around the site's three accessible sides – one every 10 linear feet.



Josh Peltier, TerraFirma Earth Technologies
The aerial view of the Platte 15 site, with the completed ejector pump station, groundwater filtration equipment and ejector wells along the north side of the excavation.

Also unique to the project was the use of the sonic drilling methodology in advancing each borehole several feet into the bedrock. By employing the use of sonic drilling technology, not only were we able to fully penetrate the water-bearing alluvium overburden; but we also were able to penetrate the highly weathered portion of the bedrock, which often can be another source of groundwater. With the sonic drilling methodology, the 64 ejector wells were installed and ready for operation just three weeks after mobilizing.

From the ejector wells, the groundwater was directed through a storm drain leading to the Platte River; however, as is true of many construction sites in the downtown Denver

Please see **Platte 15,** *Page 17*

Colorado Impact Fees

Proposed revisions for Colorado's impact fee statute

Carter Froelich, CPA
Managing principal, southwest and mountain regions, Development Planning & Financing Group Inc.

Development impact fees are fees levied by jurisdictions on new development in order to offset the impacts of the new development on existing infrastructure. Prior to the implementation of any DIFs, the jurisdiction must commission an independent third-party impact fee study to support the new DIFs. Questions and concerns related to these studies' underlying assumptions and methodology are common and frequent.

In practice, it is suggested that the building and development community should meet with a jurisdiction's staff to discuss concerns and to reach an accord prior to DIF implementation. In reality, however, it is common for a jurisdiction to largely ignore the communities concerns, especially if they could result in a decrease to the existing or proposed DIFs. In many situations, the builders, developers and/or industry associations simply allow these matters to go unresolved through delay or seek litigation as the next best step. Given the time and costs involved with litigation, the net effect typically is for the community concerns to go unheard and unresolved. This results in the development community reluctantly paying DIFs, which may not be supported by state statues, case law or industry standards.

Some reoccurring concerns found in these studies include:

1. New growth paying for non-growth-related infrastructure;
2. Inaccurate data on a jurisdiction's existing levels of service;
3. Lack of service areas to adequately define existing levels of service;
4. DIFs funding in excess of existing levels of service;
5. DIFs used to correct existing deficiencies in infrastructure;
6. Disproportionality of DIFs paid and benefits received; and
7. Lack of transparency in the entire DIF collection and expenditure process.

For the numerous DIFs that may be required on your current or future project it is important to get your hands on and to understand the study behind those DIFs. It is not uncommon to find DIFs being improperly collected and expended by jurisdictions.

■ **New approach.** Rather than battle with jurisdictions one at a time about the merits of their studies, it is sometimes easier to just change a state's enabling legislation. With the relatively new ability of fire districts, for example, to charge DIFs in Colorado through House Bill 16-1066, fire DIFs in addition to other DIF studies are being updated furiously. Many builders and developers have reached an impasse with the DIFs being charged on new development.

Colorado's DIF statute, Colorado Revised Statute 29-20-104.5, is quite vague and allows for jurisdictions to interpret its meaning with tremendous flexibility. As a result, courts allow the jurisdictions great breadth in calculating DIFs, while jurisdictions have little patience for the communities concerns for fairness and equity.

Given our experience with Colorado's jurisdictional studies and with changing DIF statutes in many states, we ask for a call of action to be made to the Colorado building industry to consider updating the act in accordance with the items below:

1. Narrow the usage of DIFs by including the phrase "necessary public services."
2. Limit DIFs to be used for the proportional share of new development infrastructure cost and prohibit their use for increasing the levels of service for existing residents.
3. Require that multiple service areas be utilized within a jurisdiction in order to adequately define the existing levels of service.
4. Mandate that the public facilities necessary to service new growth be clarified and determined in each service area.
5. Require capital improvement plans to identify all capital projects subject to DIFs, disclose existing facilities, disclose costs of existing facilities not associated with new development, identify offsets to infrastructure costs financed by DIFs, and require construction cost estimates to be prepared by only Colorado licensed professionals.
6. Outline how DIF credits are determined when the private sector is required to construct infrastructure for which DIFs also are being collected.
7. Mandate a refund of certain DIFs to current property owners if the infrastructure for which the DIF was intended is not built within 10 years, or within 15 years for water and wastewater projects.
8. Require the creation of an advisory committee to provide input on the adoption and administration of DIFs.
9. Create public notice and hearing procedures for assessing, adopting and amending DIFs, as well as the requirement that studies and capital improvement plans be replaced using the new system within a specified time frame.
10. Provide for biennial audits of a jurisdiction in order to verify that DIFs are being utilized pursuant to the supporting study.

While the proposed revisions to the act are sweeping, they address the issues voiced by the building industry and are not without precedent. In 2011, Arizona's Legislature passed Senate Bill 1525, which implemented the items above in order to address issues of fairness, equity and transparency related to the estimation, collection and expenditure of DIFs. By all accounts, the changes to other states DIF statutes have brought much needed clarity to the collection and expenditure process. We believe it is time that Colorado considers similar measures.▲

Land

Continued from Page 4

multitude of factors including, but not limited to, lot size, finished square footage, unit type, neighborhood, location, school district, etc. It is likely that municipalities and service districts will only continue to raise their impact fees in the future as burdens on infrastructure mount without plans in place.

Therefore, if we take a moment to understand the direction of the four factors mentioned, we have identified one (rents/user pricing) moving in a positive direct, yet the other three are going in a negative direction. Three against one doesn't fair well for future land pricing to escalate at a rapid pace, but rather the indicating factors are telegraphing that land pricing has peaked for now. However, absent a significant decline in the economy, nothing points to a significant decrease in land prices, as population and job growth should keep the market afloat.▲

Louisville

Continued from Page 6

such as expansive, contaminated or soft soils; dipping bedrock; steep or unstable slopes; and many others. The key to success is to abandon the cookie-cutter approach and analyze the specific issues at hand.

• **Calculate return on investment, not just cost.** The cost of mitigating coal mines was a steep hill to climb and was not without risk. But Foundry saw past the risks and higher costs to the land's inherent value. DELO was one of the last undeveloped land parcels in desirable Historic Old Town Louisville, an area that features the city's museum, city hall and public library, restaurants, shops, galleries and public spaces that host civic events such as the Downtown Street Faire. By turning around the land, Foundry created value where there wasn't any and developed a project that will "live" far beyond a seven-year budget.

DELO will be near completion by the end of this year. It already stands as a shining example of urban redevelopment done the right way – with a smart, patient team committed to creating the best possible product. ▲

COS

Continued from Page 5

building is up with a 100,000-sf phase two building to follow. Convenience retail development also is being planned on small neighborhood sites along the corridor. A 25-acre industrial site at Powers and Fountain boulevards is under contract to a developer with plans to subdivide the property for smaller industrial and commercial users.

The next three years should be good for job creation in Colorado Springs and El Paso County. This year, U.S. News and World Report ranked Colorado Springs as the second-best place to live in the nation. We are the beneficiaries of the strongest economy in years, the multitude of activity in Denver and a resurgence of employers that seem to have rediscovered our city. Colorado Springs remains a bargain for employers and employees alike. The younger professional population is growing rapidly as millennials find the city affordable and increasingly vibrant. We have always sold ourselves on our high quality of life and low cost of doing business, and those factors remain at our core. Pay attention to Colorado Springs. Good things are happening.▲

Platte 15

Continued from Page 8

area, the preliminary geotechnical and environmental sampling reports revealed groundwater that was contaminated.

To deal with the contaminated groundwater, we teamed up with BakerCorp. Its extensive experience in the downtown area and knowledge of its groundwater chemistry, as well as its working relationship with the various regulatory agencies involved, has been invaluable. This process has proven itself effective and cost efficient in achieving the desired results. The system was designed for flows up to 150 gallons per minute, and required an area just 12 feet wide and 80 feet long to accommodate both the ejector well dewatering system and the filtration equipment – a benefit to this zero lot line project, returning pure, drinkable water to the Platte.

The Platte 15 team also includes architect OZ Architecture.▲

Water

Continued from Page 9

along the Front Range provide some general perspective on the replacement cost of water. North of Denver, the Northern Integrated Supply Project is expected to have a capital cost of roughly $1 billion and an average yield of 40,000 acre feet, resulting in a unit cost of $25,000 per acre foot. In south Denver, the Chatfield Reservoir Reallocation Project is expected to have a unit cost of nearly $19,000 per acre foot.

• **Final thoughts.** The Colorado Front Range continues to have an active water market driven by land development and growth. Valuing water rights may seem overly complicated, and it certainly can be at times, but market values usually are based on some sound fundamentals that consider the buyer and seller perspectives. ▲